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Claims

[c1] A scatterometry target, comprising:
a plurality of parallel elongated features, each having a length in a lengthwise direction; and
a plurality of stress-relief features disposed at a plurality of positions along said length of each said elongated feature.

[c2] The scatterometry target of claim 1 wherein said elongated features include linearly extending features, wherein said stress-relief features include connecting features which connect pairs of said elongated linearly extending features in a direction transverse to said lengthwise direction.

[c3] The scatterometry target of claim 1 wherein said stress-relief features include gaps, said gaps interrupting said elongated features.

[c4] The scatterometry target of claim 2 wherein said stress-relief features further include gaps, said gaps interrupting said elongated features, wherein said scatterometry target including said connecting features and said gaps is adapted to produce a return signal mimicking a return

signal from a scatterometry target not having said stress-relief features.

[c5] The scatterometry target of claim 4 wherein said elongated linearly extending features are provided in a layer of photoresist.

[c6] The scatterometry target of claim 5 wherein said elongated linearly extending features mimic patterned photoresist layer features at critical dimension.

[c7] The scatterometry target of claim 1 wherein said stress-relief features include jogs in said parallel elongated features.

[c8] The scatterometry target of claim 2 wherein said connecting features include bridges, said bridges satisfying the relation $2\% > (N_B L_B)/NL$, where N_B is the number of bridges of the grating, L_B the length of each bridge, N the number of lines of the grating, and L the length of the grating.

[c9] The scatterometry target of claim 3 wherein said gaps satisfy the relation $2\% > (N_G L_G)/NL$, where N_G is the number of gaps of the grating, L_G the length of each gap, N the number of lines of the grating, and L the length of the grating.

[c10] The scatterometry target of claim 7 wherein said jogs satisfy the relation $f_J(N_J/N)(W/L) < 2\%$, where N_J is the number of jogs of the grating, N the number of lines of the grating, L the length of the grating, W the width of the grating, and f_J a process factor.

[c11] A scatterometry target, comprising:
a plurality of parallel elongated features each having length in a lengthwise direction, each said elongated feature having jogs disposed at a plurality of locations along said length, said jogs causing said scatterometry target to produce a return signal which is sensitive to photolithographic defocus.

[c12] The scatterometry target of claim 11 wherein said jogs satisfy the relation $f_J(N_J/N)(W/L) > 1$, where N_J is the number of jogs of the grating, N the number of lines of the grating, L the length of the grating, W the width of the grating, and f_J a process factor.

[c13] A method of monitoring photolithographic process, comprising:
providing a first scatterometry target having a plurality of parallel elongated features, each having a length in a lengthwise direction and a plurality of stress-relief features disposed at a plurality of positions along said length of each said elongated feature;

illuminating said first scatterometry target;
detecting a return signal from said first scatterometry target;
comparing said return signal to signals of a library of stored signals to determine a match; and
monitoring photolithographic process based on said determined match.

[c14] The method of claim 13 further comprising:
providing a second scatterometry target having a plurality of parallel elongated features each having length in a lengthwise direction, each said elongated feature having jogs disposed at a plurality of locations along said length, said jogs causing said scatterometry target to produce a return signal which is sensitive to photolithographic defocus.

[c15] The method of claim 14 wherein said stress-relief features include connecting features which connect pairs of said parallel elongated features in a direction transverse to said lengthwise direction, and said stress-relief features further include gaps, said gaps interrupting said elongated features, wherein said first scatterometry target including said connecting features and said gaps is adapted to produce a return signal mimicking a return signal from a scatterometry target not having said stress-relief features.

[c16] The method of claim 15 wherein said parallel elongated features are provided in a layer of photoresist.

[c17] The method of claim 16 wherein said parallel elongated features mimic patterned photoresist layer features at critical dimension.

[c18] The method of claim 18 wherein said first scatterometry target overlies a structure layer, and said stored signals of said library represent an effect of said structure layer on said return signal.